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type of lamp, the use of which, undoubtedly, will increase the present number of observing nights per month by at least twenty-five per cent.

The main part, an ordinary automobile head light, is suitably mounted for directing in the horizontal and vertical; the lamp is provided with an ammeter, a small rheostat and a switch. The whole, packed in a strong case, weighs twenty-three and one half pounds.

In order to obtain most nearly the maximum intensity of the light, it was necessary that the lamp bulb be provided with a filament concentrated to a degree not found in those on the market. One of the lamp manufacturers was induced to make the necessary designs and experimental tests, and submitted a number for trial.

At the present time all the lights of the stations surrounding the observer's station are kept burning continuously from sunset to the closing of the observations for the night. The use of the dry cell was found practicable and not too costly on the assumption that the proposed lamp was to be kept burning throughout the night. The trial of the newly designed lamp by comparison with the present acetylene lamp, however, proved the former so much superior, that it was decided to have the lights shown only on signal, flashed with one of the new lamps by the observer, for the few minutes each time it is observed upon. This reduces very materially the consumption of current and battery cost.

The lamp, after being provided with two additional bulbs, one for medium and one for short distances, was tested by the Bureau of Standards, with the following results:

Apparent candle power, at a distance of 100 ft. Lamp with specially concentrated filament, gas filled, 6 volts, 2.5 amp. ....	250,000
Automobile lamp, 6 volts, 1.8 amp. ....	50,000
Flash light lamp, 2.7 volts, .34 amp. ....	6,000

The candle power of the acetylene lamp now used in the triangulation carried on by the survey, measured under the same conditions, is 1,500.

E. G. FISCHER

U. S. COAST AND GEODETIC SURVEY

# SPECIAL ARTICLES LINKED MENDELIAN CHARACTERS IN A NEW SPECIES OF DROSOPHILA

IN my cultures of a new species of *Drosophila*, tentatively called "species B,"<sup>1</sup> several mutants have recently appeared. They have not all been tested fully with respect to their linkage relations, but enough has been learned to suggest some interesting possibilities when considered in connection with the results of Morgan and others on *Drosophila ampelophila*. Three linkage groups have already been obtained in my material, and five characters remain to be studied. Of the linkage groups one is sex-linked and contains four characters, the others are non-sex-linked and are composed, respectively, of one and two characters.

So far as the evidence goes, it indicates a mode of inheritance in this fly entirely comparable with that in *D. ampelophila*, although I have as yet been unable to determine whether or not there is "crossing over" in the male, because the only linked factors thoroughly studied (aside from the sex-linked group) are completely linked and give no crossing over in either sex.

The most interesting feature of the results, as they stand at present, is the apparent correspondence between certain mutant characters in this species and in *D. ampelophila*. Four of the characters I have obtained show this correspondence. One of them ("confluent") has already been recorded.<sup>1</sup> It is a dominant, non-sex-linked character, and has a lethal effect when flies are homozygous for it. Its counterpart in *ampelophila* is an almost exact duplicate in appearance, and apparently has the same peculiarities in genetic behavior. There seems to be little doubt that these characters are actually alike in the two species. The other three are "black," "yellow" and "forked." Black has only been studied enough to tell that it is not sex-linked; and since there are two or three factors in *ampelophila* that give a melanistic effect, there is some doubt as to which, if any, is really comparable to the one I have found. But with respect to yellow and forked the case is different, for they not only correspond exactly in appearance, but

<sup>1</sup> Metz and Metz, "Mutations in Two Species of *Drosophila*," *Amer. Nat.*, 1915.

they belong to the same linkage group, in both species. Since this happens to be the sex-linked group it means in reality that three corresponding factors—the sex factor, the yellow factor and the forked factor—are linked in both species. Whether the same degree of linkage obtains in each has not been determined.

It is, of course, too early to generalize from this one case, but certainly the evidence strongly suggests that there is a genetic continuity of factorial associations in these flies. And if the factors are located in the chromosomes it is equally suggestive of a genetic continuity of the chromosomes.

So far as I know this is the first clear case of the kind on record, and since the work promises further evidence on the same point a word may be said regarding the chromosomes of the species concerned. As is well known *Drosophila ampelophila* has four pairs of chromosomes—two of large euchromosomes, one of shorter sex-chromosomes and one of very small “m-chromosomes.” In contrast to this the species I am breeding has six chromosome pairs, of which only two resemble those in *ampelophila*. The latter are the sex-chromosomes and the “m-chromosomes.” The other four pairs replace the two euchromosome pairs of *ampelophila* and are individually about half their size.<sup>2</sup>

Upon the chromosome hypothesis characters in this new species should fall into six linkage groups instead of four. And what is of much greater interest, if present indications are reliable, it may eventually be possible to compare these groups (and hence the chromosomes?) individually with those in *ampelophila* by means of corresponding characters. The first step in this comparison may be represented by the sex-linked characters yellow and forked mentioned above.

A more detailed report of these results will be presented as soon as certain experiments now under way are completed.

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<sup>2</sup> See Metz, C. W., “Chromosome Studies in the *Diptera*,” I., *Jour. Exp. Zool.*, 1914, p. 50.

#### BACTERIAL BLIGHTS OF BARLEY AND CERTAIN OTHER CEREALS

At the Columbus meeting of the American Phytopathological Society the writers reported on a bacterial disease of barley. This was described as a widely occurring disease attacking leaves, leaf sheaths and glumes, early characterized by water-soaked lesions with bacterial exudate, and later by the persistent transparency following the death of the parts invaded. The abstract of this paper appeared in *Phytopathology* (Vol. 6, p. 98). Laboratory and field studies have now been completed which confirm all of the preliminary statements and furnish the data for the publication of the causal organism as a new species. It is a monotrichous rod with a single polar flagellum, hence referable to Migula's genus *Pseudomonas*. Field and laboratory studies have combined to show that it is seed borne, and that in this way it is readily disseminated. This fact accounts for its very general distribution, it having already been collected from eight states. Not only has the development of the disease been traced in the field where infected seed was used, but, in addition, the organism has been secured in pure culture from seed collected two years previously, and successful inoculations with this have proved its continued virulence.

Diseases very similar to the one on barley have been found and studied on wheat, spelt and rye. These have all been proved to be of bacterial origin. From each of these hosts the causal organism has been isolated, and its pathogenicity fully determined. The organisms from these three sources are apparently all one species and they are very similar to the barley blight organism.

This similarity holds for the appearance and development of the disease lesions, and for the morphological and cultural characters of the organisms. All like the barley organism are monotrichous and yellow in culture. The chief difference noted is in the behavior in cross inoculations. The barley blight organism when inoculated on wheat, rye, spelt, oats and barley, infects barley only. The wheat,